Space Weather Forecast

Issued on Monday 20 January 2025 at 13:29 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares expected with a slight chance of X-class (Strong) flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low, with a peak high Common class flare from a sunspot region in the northwest. A sunspot near the central meridian in the southern hemisphere remains the largest sunspot on the disc with occasional low-level Common-class flare activity. Some slight increase in overall size was observed, but also slight decay in its main trailer spot. Despite its size it maintains a fairly simple magnetic configuration. The sunspot in the northwest, responsible for the strongest flare of the period persisted with a large leader spot and strong magnetic field, but just limited small opposite polarity spots to its east and northeast and a relatively simple magnetic structure. A region in the far northwest was responsible for some low-level Common-class activity and remains moderately complex, however, became increasingly foreshortened in available solar imagery as it approached the western limb. Elsewhere there was some emergence of small sunspot groups, but these were largely inactive.

Disappearing filaments (eruption of lines of the Sun's plasma) in the southeast disc around 19/2300 UTC and 20/0515 UTC were observed, however, no definitive Coronal Mass Ejections (CMEs) were in evidence following either event. Therefore no clear Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: Ongoing fast winds from a coronal hole were observed. Solar wind speed increased from slightly elevated to become strong, reaching 600-650km/s by the end of the period. Interplanetary Magnetic field, Bt, was Weak to Moderate with the north-south component also Weak to Moderate, with no single orientation (direction) favoured. Geomagnetic activity was Quiet to Active (Kp2-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at Background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast, with isolated Moderate-class flares expected. There is a slight chance of Strong flares.

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Solar Wind / Geomagnetic Activity: There are no CME arrivals expected at Earth, however a glancing impact from the Coronal Mass Ejection (CME) early on 18 Jan cannot be completely ruled out late on Day 1 (20 Jan) or early Day 2 (21 Jan). Otherwise, current strong fast winds from a coronal hole are expected to continue before gradually easing from Day 2 (21 Jan) onward, likely becoming near background by the end of Day 4 (23 Jan). Mainly Quiet to Unsettled geomagnetic activity is expected, with a chance of Active intervals, these most likely on Day 1 and 2 (20 and 21 Jan).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at Background with no Solar Radiation Storms occurring. However, there is a slight chance of this rising in response to any significant flares that occur.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	85	85	75	75
Very Active	R3-R5 (X Class)	No	15	15	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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